

# Lab 1: Exploring the deep learning platform

July 25

## Objective:

To understand various deep learning platforms, install key frameworks and run a basic deep learning script using Pytorch and tensorflow

## Observation:

### 1. TensorFlow:

\* Creator / organization: Google Brain team

\* Main features:

- Open source deep learning library
- Support both CPU and GPU
- Has high-level APIs like Keras
- Support static computation graph

\* Popular use cases:

→ Image classification

→ Natural language processing

→ Time series prediction

\* Graph type: static and eager (dynamic) mode in newer versions.

### 2. PyTorch

\* Creator / organization: Facebook AI Research lab (FAIR)

\* Main features:

→ Pythonic and easy to debug

→ Dynamic computation graph

→ Strong community support

→ Native support for GPU

\* Popular use cases:

→ Research and rapid prototyping

→ Computer vision, NLP & reinforcement learning

\* Graph type: Dynamic computation graph

### 3, Google colab

\* creator / organization: google

\* main features:

→ Free Jupyter notebook environment with GPU support

→ cloud based, no installation required

→ easy collaboration

\* popular use cases:

→ Educational and quick experimentation with deep learning.

→ data visualization, model training

\* Notes: Best for beginners without GPU hardware

### 4, Jupyter Notebook / lab

\* creator / organization: project-Jupyter

\* main features:

→ open source notebook interface

→ supports multiple languages

→ rich media output

\* popular use case:

→ data exploration

→ model prototyping

→ code documenting with results

### 5, ~~many~~

model deployment support

\* many platforms now provide native tools for deploying trained deep learning models

\* tensorflow lite and tensorflow serving while pytorch offers torch service.

- \* these tools help transition models from research to productive environments easily
- & integration with other tools & ecosystems
- \* both tensorflow and pytorch integrate with tools like tensorboard, onnx, and hugging face transforms
- \* google colab support integration with google drive for persistent storage ~~and~~ and dataset access.

differences between static vs dynamic Graphs

features	static Graph (e.g. tensorflow 1.x)	dynamic Graph (e.g. Py torch)
definition	define the graph before running	graph is defined while running
flexibility	less flexible	more flexible
debugging	Harder to debug	easier to debug

conclusion: this lab helped to gain experiences with leading deep learning frameworks.

~~11/13/2021~~